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II. Remarks


Claims 1-16 are pending in the application. Claims 1-16 have been amended. The claim amendments presented above are being submitted by Applicants for the purpose of pointing out and more particularly claiming that which Applicants believe to be their invention.

SUMMARY

Upon entry of the present amendment, Applicants respectfully submit that the no new matter has been added. Applicants respectfully request entry of the preliminary amendment.

Respectfully submitted,

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Date


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RECEIVING PART OF A FLUID PLUG-IN COUPLING

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a receiving part of a fluid plug-in coupling. wherein "fluid" is to be understood as meaning any hydraulic or gaseous flow medium), comprising a socket housing having a plug-in opening for a plug part and having a retaining device for releasably fixing the plugged-in plug part in place. The retaining device having includes a retaining element which that is mounted elastically deformable retaining sections for latching engagement behind a radial retaining step of the plug part. The retaining device also includes a release element which is secured in an axially displaced manner relative to the socket housing via latching means. The release element engaging engages by means of an inner release section in the plug-in opening and, for release purposes, acting acts against the retaining sections of the retaining element.

2. Related Technology

[0002] EP 0 727 027 B1 describes a rapid-action coupling of this type, in which the release element comprises an inner sleeve and an outer sleeve. As a release section, the inner sleeve acts against the retaining sections of the retaining element. In this connection, the plug part may be released unintentionally under certain operating conditions, as a result of which potentially causing the particular fluid can also to leak out.

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SUMMARY OF THE INVENTION

[0004] [[The]] One aspect of the present invention is ~~based on the object of~~
~~providing to provide~~ a receiving part of the mentioned type which has increased
security against unintentional release and leakages.

[0005] According to the aspects of the invention, [[this]] the increased security
is achieved by a securing element ~~in such a manner provided such~~ that the release
element is blocked in a ~~securing~~ secured position against a release movement and
is unblocked in an ~~unlocking~~ unblocked position for a release movement. This
prevents unintentional release. On the contrary, for release purposes, the
arrangement must first be transferred from the ~~securing~~ secured position into the
~~unlocking~~ unblocked position ~~and only then can~~ for the release element to be
moved axially against the retaining sections of the retaining element.

[0006] In addition to this, an integrated blocking valve can advantageously be
provided, which automatically closes in the decoupled state and is automatically
opened by the plug part being plugged in. As a result, leakages are largely avoided
even in the decoupled state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The invention will be explained in greater detail with reference to
preferred exemplary embodiments which are illustrated in the drawing, in which:

[0008] Fig. 1 shows a half section, [[()]] the upper half [[()]], of a first
embodiment of a receiving part having a plug part and a receiving part and
~~according to the embodying the principles of the present~~ invention, [[with]] the plug
part being plugged in the blocked,

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[0009] Fig. 2 shows a half section the ~~the~~ corresponding lower half ~~of the~~ of the receiving part having a release element in a release position ~~of the release element~~ for unblocking the plug part.

[0010] Fig. 3 shows ~~the~~ the half section ~~similar to shown in fig. 2~~ with the plug part ~~semewhat pulled out~~ partially withdrawn from the release element.

[0011] Fig. 4 shows an end view of the receiving part shown in Figs. 1 and 2 taken along line IV-IV ~~(plane IV-IV according to figs 1 and 2)~~,

[0012] Fig. 5 shows a perspective exploded view of the release element, a retaining element, and a securing element shown in Figs. 1-4 ~~certain individual parts,~~

[0013] Fig. 6 ~~shows a further~~ is a perspective view of the components shown in Fig. 5 from a ~~as in fig. 5 from a somewhat different viewing direction,~~

[0014] Fig. 7 shows ~~a view of the fitted individual parts according to the~~ components shown in figs. 5 and 6 in a securing secured position,

[0015] Fig. 8 shows the arrangement ~~according to~~ components shown in fig. 7 in an unblocking unblocked position,

[0016] Fig. 9 shows ~~a variant~~ another embodiment of the receiving part ~~according to the~~ embodying the principles of the present invention in a longitudinal section ~~similar to figs. 1 and 3,~~ the blocked position being illustrated in the upper half of the figure (fig. 9a) and the release position being illustrated in the lower half (fig. 9b),

[0017] Fig. 10 shows a partial side view of the further embodiment of the plug-in coupling in the release position,

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[0018] Fig. 11 shows an end view in the arrow direction XI ~~according to~~ in fig. 10.

[0019] Figs 12 to 14 show longitudinal sections of the plug-in coupling in the blocked position, specifically fig. 12 in the section plane A-A ~~according to~~ in fig. 11, fig. 13 in the section plane B-B ~~according to~~ in fig. 11, and fig. 14 in the section plane C-C ~~according to~~ in fig. 11.

DETAILED DESCRIPTION OF THE INVENTION

[0020] In the various figures of the drawings, identical parts are always provided with the same reference numbers.

[0021] As emerges initially from figs 1 to 3 and also fig. 9 and figs. 12 to 14 in each case, a plug-in coupling ~~comprises~~ includes a receiving part 2 and a plug part 4. However, the invention relates ~~only~~ particularly to the receiving part 2 while the plug part 4 has a standard design ("SAE plug") in the form of a section of pipe which has an annular projection 8 ~~so as to~~ form a radial retaining step 6 on its outer circumference.

[0022] The receiving part 2 comprises a socket housing 10 having a plug-in opening 12 for the plug part 4 and having a retaining device 14 for releasably fixing the plugged-in plug part 4 in place. For this purpose, the retaining device 14 has a retaining element 16 which is mounted in the socket housing 10, this retaining element 16 for its part having radially elastically deformable retaining section 18 for latching engagement behind the retaining step 6 of the plug part 4. ~~It is preferable if~~ a plurality of radially symmetrical retaining sections 18, for example eight retaining sections 18, are preferably provided (see fig. 11), but only two of them are illustrated in each case in figs. 5 ~~[[to]]~~ through 8. The receiving part 2 ~~furthermore~~ additionally

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has a release element 20 which is secured in an axially displaceable manner relative to the socket housing 10 via latching means 22. In this case, the release element 20 engages by means of an inner release section 24 in the plug-in opening 12 and for the purpose of releasing the blocked plug part 4, acts here against the retaining sections 18 of the retaining element 16 in such a manner that they can be expanded and causes the retaining sections to expand radially so as to unblock the plug part 4. More specifically, an inner release section 24 located within the plug-in opening 12 acts against the retaining sections 18 to release the blocked plug part 4. According to one embodiment of the invention, the receiving part 2 has a securing element 26 positioned ~~in~~ such a manner that the release element 20 is blocked in a securing secured position (figs. 1, 7, 9a and 12-14) against preventing an axial release movement and is unblocked in an unblocking unblocked position (figs. 2, 3, 8, 9b and 10) ~~for~~ permitting a release movement. The securing element 26 and the release element 20 are preferably rotatable about the coupling axis 28 relative to each other between the ~~securing~~ secured position and the ~~unblocking~~ unblocked position. ~~In this case, on the one hand, the~~ The release section 24 of the release element 20 is designed as preferably a hollow cylindrical inner sleeve and, ~~on the other hand,~~ Additionally, the securing element 26 is designed as a ring (or annular disk) which coaxially ~~surrounds~~ surrounding the inner sleeve, and is arranged axially in front of the end side of the socket housing 10.

[0023] As ~~can best be seen in detail view of~~ shown in figs. 5 to 8, the release element 20 has at least one radial securing projection 30 on the outer circumference of the release section 24. ~~In the embodiment illustrated,~~ More specifically, four radially symmetrical securing projections 30 are provided. Each ~~each~~ securing

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projection 30 ~~rests~~ resting on an end surface 32 of the securing element 26 in the securing position~~[[, but]].~~ The securing projections 30 can be guided axially through a corresponding radial recess 34 of the securing element 26 in the ~~relatively rotated~~ unblocking unblocked position. In this connection, it is furthermore advantageous if the end surface 32 of the securing element 26 has a wavy contour ~~in the direction of rotation in such a manner~~ that a bearing region for the associated securing projection 30 (in the securing secured position) is formed ~~in each case~~ in the region of an axially recessed wave trough 36, and the axial recess for passing the securing projection 30 through (in the unblocking unblocked position) is formed in each case in the region of an axially raised wave crest 38.

[0024] The securing element 26 is preferably connected, such as latched, to the socket housing 10, ~~in particular latched~~, in a manner secured against rotation. For this purpose, the securing secured element 26 preferably has at least two axial latching arms 40 which engage in the socket housing 10 and engage behind an edge. According to fig. 4, the socket housing 10 has recesses 42 on the end sides for the latching arms 40.

[0025] The release element 20 is preferably secured indirectly in the socket housing 10, specifically via the retaining element 16 in the embodiment according to figs. 1 to 8. For this purpose, the retaining element 16 has at least one, or as illustrated two, radial retaining arms 44 which engage are located in a retaining groove 46 formed on the outer circumference of the inner sleeve 24. The retaining groove 46 is dimensioned here in the axial direction to be of such a width that it permits the axial release movement of the release element 20 in spite of the retaining arms 44 being in engagement.

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[0026] According to the invention, the receiving part 2 furthermore has an integrated blocking valve 50 which automatically closes the fluid passage in the decoupled state and opens by the plug part 4 being when plugged in to the plug-in opening 12. The blocking valve 50 has an axially moveable valve element 52 according to figs. 1 to 3 and 9 with bearing section 54 for the plug part 4. ~~According to figs. 1 to 3 and 9, this~~ The bearing section 54 is guided displaceable within the socket housing 10 for the purpose of guiding to guide the plug part 4. for this purpose, the bearing section 54 is preferably of ~~essentially hollow~~ substantially cylindrical design and has an expanded holder 56 for a free end region of the plug part 4. As a result, in its state in which it is guided with a relatively low amount of clearance into the holder 56, the free end region of the plug part 4 is guided within the socket housing 10 via the bearing section 54. The blocking valve 50 is prestressed in the closing direction by a valve spring 58.

[0027] A few more variant embodiments will be explained. Referring now to fig. 9, another embodiment of the present invention will now be described. ~~In the embodiment according to fig. 9, the~~ The release element 20 shown in fig. 9 is latched onto the outside of the outer circumference of the socket housing 10.

[0028] ~~In the yet another embodiment,~~ illustrated in figs. 10 to 14, the release element 20 is secured indirectly via the securing element 26. For this purpose, the release element 20 has at least two axially extending, diametrically opposite retaining arms 60 which are moveable in a resilient manner in the radial direction and have radially outwardly directed latching lugs 62 at their front ends, ~~which protrude~~ protruding into the receiving part 2. Reference is made in this respect in particular to fig. 14. The securing element 26 has a radially inwardly-pointing

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annular collar 64 with an inner bearing surface 66. The release element 20 can be latched to the latching lugs 62 of the retaining arms 60 through the annular collar 64~~[[.]].~~ By bearing against the annular collar 64, the latching lugs 62 also ~~serving~~ serve to secure ~~prevent~~ the release element 20 ~~against from~~ being pulled out~~[[.]].~~ ~~by bearing against the annular collar 64.~~ In addition, ~~provision is advantageously made~~ for the release element 20 ~~to be~~ is acted upon by a spring for F_x which acts axially in a release-actuating direction (see fig. 14). In the embodiment illustrated, this is achieved by the resilient retaining arms 60 having outer, cone-like oblique surfaces 68, which interact radially with the inner bearing surface 66 of the annular collar 64 of the securing element 26 to produce the spring force F . ~~By means of this advantageous refinement, the~~ The element 20 is thus constantly pulled into the receiving part 2 by the spring force F , so that the securing projections 30 are always retained in the wave troughs 36 and can only be transferred counter to the spring force F into the region of the wave crests 38.

[0029] In this ~~the~~ embodiment ~~according to shown in~~ figs. 10 to 14, ~~provision is furthermore made for the valve element 52 of the blocking valve 50 to interact~~ interacts in its closed position (not illustrated) with a sealing arrangement 70 - in this example formed by two axially spaced apart sealing rings - which is also provided, in accordance with the illustration in the drawings, for sealing the plug-in plug part 4.

[0030] As an alternative, the release element 20 may also be connected, in particular latched, to the retaining element 16 ~~in a manner secure against to~~ prevent rotation therebetween.

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[0031] The end contour of the securing element 26 with the recesses 34 may also be formed directly (integrally) on the socket housing 10, so that the socket housing 10 has at the same time the function of the securing element 26.

[0032] The retaining element 16 can have additional latching means for the axially resilient fastening of the release element 20. In addition, the retaining element 16 can have additional spring arms which additionally hold a sealing closing bushing (not illustrated).

[0033] A dirt seal 48 is advantageously provided which can be formed by a thin rubber disk which is inserted between the socket housing 10 and the securing element 26 and is matched on the inside to the contour of the plug part 4. In the embodiment according to fig. 9, a sealing element 48 of this type can also be arranged axially in front of the end side of the socket housing 10 in the clearance between the inner sleeve 24 and the outer latching means 22 of the release element 20. However, this sealing element 48 ~~has to take into account~~ accounts for the installation space for the securing element 26. Furthermore, a radial sealing lip can also be arranged directly on the release element in such a manner that it extends radially inward and ~~comes to rest~~ rests on the circumference of the plug part 4.

[0034] The receiving part 2 according to the invention can be operated as follows:

[0035] a) Single-handed operation. For single-handed operation, either the securing element 26 or the release element 20 ~~has to be~~ is fixed in place relative to the socket housing 10 ~~in a manner secured~~ to secure against rotation. Rotation of the release element or of the securing element causes the securing projections 30 to pass out of the stable position of equilibrium (wave trough) into a position in which

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the securing projections 30 can be aligned in the region of the wave crests with the recesses 34 and can thus be passed axially through them.

[0036] b) Two-handed operation. In this case, neither the securing element 26 nor the release element 20 is fixed in place relative to the socket housing 10 in a manner secured against rotation. The two elements therefore ~~have to be~~ are held and moved manually during the relative rotation.

[0037] The block can be checked by a) the distance between the release element 20 and securing element 26, or b) optical features (for example colored identification) on the securing projections 30 and/or on the inner sleeve 24 of the release element 20.

~~[0038] In invention is not restricted to the exemplary embodiments which have been illustrated and described, but also comprises all embodiments acting in an identical manner in the sense of the invention. Furthermore, the invention has also not yet been restricted to the combination of features defined in claim 1, but rather may also be defined by any other desired combination of specific features of all of the individual features disclosed as a whole. This means that in principle virtually any individual feature of claim 1 can be omitted or can be replaced by at least one individual feature explained elsewhere in the application. In this respect, claim 1 is to be understood only as an initial attempt at putting an invention into words.~~

[0039] It is therefore intended that the foregoing detailed description be regarded as illustrative rather than limiting, and that it be understood that it is the following claims, including all equivalents, that are intended to define the spirit and scope of this invention.